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#6

SEQUENCE LISTING

<110> Levy , Ilan

Shoseyov, Oded

Nussinovitch, Amos

<120> MODIFICATION OF POLYSACCHARIDE CONTAINING MATERIALS

<130> 00/20910

<140> 60/166,389 and 60/164,140

<141> 1999-11-18 and 1999-11-08

<160> 13

<170> PatentIn version 3.0

<210> 1

<211> 507

<212> DNA

<213> Clostridium cellulovorans

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atgacgtaaa agtttagatat tattacacaa gtgatggtag acaaggacaa actttcttgt	180
gtgaccatgc tggtgcatta ttaggaaata gctatgttgta taacacttagc aaagtgcacag	240
caaacttcgt taaagaaaca gcaagccaa catcaaccta tgatacatat gttgaatttg	300
gatttgcaag cggacgagct actcttaaaa aaggacaatt tataactatt caaggaagaa	360
taacaaaatc agactggta caactacactc aaacaaatgtc ctattcattt gatgcaagta	420
gttcaacacc agttgtaaat ccaaaagtta caggatataat aggtggagct aaagtacttg	480
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<212> PRT

<213> Clostridium cellulovorans

<400> 2

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Ser Asp Ser Asp Leu Asn Leu Asp Val Lys Val Arg Tyr Tyr Tyr

35 40 45

Thr Ser Asp Gly Thr Gln Gly Gln Thr Phe Trp Cys Asp His Ala Gly
 50 55 60
 Ala Leu Leu Gly Asn Ser Tyr Val Asp Asn Thr Ser Lys Val Thr Ala
 65 70 75 80
 Asn Phe Val Lys Glu Thr Ala Ser Pro Thr Ser Thr Tyr Asp Thr Tyr
 85 90 95
 Val Glu Phe Gly Phe Ala Ser Gly Arg Ala Thr Leu Lys Lys Gly Gln
 100 105 110
 Phe Ile Thr Ile Gln Gly Arg Ile Thr Lys Ser Asp Trp Ser Asn Tyr
 115 120 125
 Thr Gln Thr Asn Asp Tyr Ser Phe Asp Ala Ser Ser Ser Thr Pro Val
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 Val Asn Pro Lys Val Thr Gly Tyr Ile Gly Gly Ala Lys Val Leu Gly
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 ctactcttaa aaaaggacaa ttataacta ttcaaggaag aataacaaaa tcagactggt 360
 caaactacac tcaaacaat gactattcat ttgatgcaag tagttcaaca ccagttgtaa 420
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<213> Clostridium cellulovorans

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Ile	Thr	Pro	Ile	Ile	Lys	Ile	Thr	Asn	Thr	Ser	Asp	Ser	Asp	Leu	Asn		
														20	25	30	
Leu	Asn	Asp	Val	Lys	Val	Arg	Tyr	Tyr	Tyr	Ser	Asp	Gly	Thr	Gln			
														35	40	45	
Gly	Gln	Thr	Phe	Trp	Cys	Asp	His	Ala	Gly	Ala	Leu	Leu	Gly	Asn	Ser		
														50	55	60	
Tyr	Val	Asp	Asn	Thr	Ser	Lys	Val	Thr	Ala	Asn	Phe	Val	Lys	Glu	Thr		
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Ala	Ser	Pro	Thr	Ser	Thr	Tyr	Asp	Thr	Tyr	Val	Glu	Phe	Gly	Phe	Ala		
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Ser	Gly	Arg	Ala	Thr	Leu	Lys	Lys	Gly	Gln	Phe	Ile	Thr	Ile	Gln	Gly		
														100	105	110	
Arg	Ile	Thr	Lys	Ser	Asp	Trp	Ser	Asn	Tyr	Thr	Gln	Thr	Asn	Asp	Tyr		
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Ser	Phe	Asp	Ala	Ser	Ser	Ser	Thr	Pro	Val	Val	Asn	Pro	Lys	Val	Thr		
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Gly	Tyr	Ile	Gly	Gly	Ala	Lys	Val	Leu	Gly	Thr	Ala	Pro	Gly	Pro	Asp		
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Val	Pro	Ser	Ser	Ile	Ile	Asn	Pro	Thr	Ser	Ala	Thr	Phe	Asp	Pro	Gly		
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attattacac	aagtgatgg	acacaaggac	aaactttctg	gtgtgaccat	gctggtgcat	180
tattagaaa	tagctatgtt	gataacacta	gcaaagtgac	agcaaacttc	gttaaagaaa	240

cagcaagccc aacatcaacc tatgatacat atgttgaatt tggatttgca agcggacgag	300
ctactcttaa aaaaggacaa ttataacta ttcaaggaag aataacaaa tcagactggt	360
caaactacac tcaaacaat gactattcat ttgatgcaag tagttcaaca ccagttgtaa	420
atccaaaagt tacaggatat ataggtggag ctaaagtact tggtacagca ccaggtccag	480
atgtaccatc ttcaataatt aatcctactt ctgcaacatt tgatcccggt accatggcag	540
cgacatcatc aatgtcagtt gaatttaca actctaacaa atcagcacaa acaaactcaa	600
ttacaccaat aatcaaatt actaacacat ctgacagtga tttaaattta aatgacgtaa	660
aagtttagata ttattacaca agtgatggta cacaaggaca aactttctgg tgtgaccatg	720
ctgggcatt attaggaaat agctatgtt ataacactag caaagtgaca gcaaacttcg	780
ttaaagaaac agcaagccc acatcaacct atgatacata tggtaattt ggatttgcaa	840
gcggacgagc tactctaaa aaaggacaat ttataactat tcaaggaaga ataacaaaat	900
cagactggtc aaactacact caaacaaatg actattcatt tgatgcaagt agttcaacac	960
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<210> 6

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<212> PRT

<213> Clostridium cellulovorans

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20	25	30
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Leu Asn Asp Val Lys Val Arg Tyr Tyr Thr Ser Asp Gly Thr Gln

35	40	45
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Gly Gln Thr Phe Trp Cys Asp His Ala Gly Ala Leu Leu Gly Asn Ser

50	55	60
----	----	----

Tyr Val Asp Asn Thr Ser Lys Val Thr Ala Asn Phe Val Lys Glu Thr

65	70	75	80
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Ala Ser Pro Thr Ser Thr Tyr Asp Thr Tyr Val Glu Phe Gly Phe Ala

85	90	95
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Ser Gly Arg Ala Thr Leu Lys Lys Gly Gln Phe Ile Thr Ile Gln Gly

100	105	110
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Arg Ile Thr Lys Ser Asp Trp Ser Asn Tyr Thr Gln Thr Asn Asp Tyr

115	120	125
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Ser Phe Asp Ala Ser Ser Ser Thr Pro Val Val Asn Pro Lys Val Thr
130 135 140
Gly Tyr Ile Gly Gly Ala Lys Val Leu Gly Thr Ala Pro Gly Pro Asp
145 150 155 160
Val Pro Ser Ser Ile Ile Asn Pro Thr Ser Ala Thr Phe Asp Pro Gly
165 170 175
Thr Met Ala Ala Thr Ser Ser Met Ser Val Glu Phe Tyr Asn Ser Asn
180 185 190
Lys Ser Ala Gln Thr Asn Ser Ile Thr Pro Ile Ile Lys Ile Thr Asn
195 200 205
Thr Ser Asp Ser Asp Leu Asn Leu Asn Asp Val Lys Val Arg Tyr Tyr
210 215 220
Tyr Thr Ser Asp Gly Thr Gln Gly Gln Thr Phe Trp Cys Asp His Ala
225 230 235 240
Gly Ala Leu Leu Gly Asn Ser Tyr Val Asp Asn Thr Ser Lys Val Thr
245 250 255
Ala Asn Phe Val Lys Glu Thr Ala Ser Pro Thr Ser Thr Tyr Asp Thr
260 265 270
Tyr Val Glu Phe Gly Phe Ala Ser Gly Arg Ala Thr Leu Lys Lys Gly
275 280 285
Gln Phe Ile Thr Ile Gln Gly Arg Ile Thr Lys Ser Asp Trp Ser Asn
290 295 300
Tyr Thr Gln Thr Asn Asp Tyr Ser Phe Asp Ala Ser Ser Ser Thr Pro
305 310 315 320
Val Val Asn Pro Lys Val Thr Gly Tyr Ile Gly Gly Ala Lys Val Leu
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Gly Thr Ala Pro
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<222> (3)..(791)

<223> pRIT2T cloning vector
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<222> (795)..(1280)
<223> from cbpA gene
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actctcaagc tccaaaagct gatgcgcaac aaaataactt caacaagat caacaagcg 180
ccttctatga aatcttgaac atgcctaact taaacgaagc gcaacgtaac ggcttcattc 240
aaagtcttaa agacgaccca agccaaagca ctaacgttt aggtgaagct aaaaaattaa 300
acgaatctca agcaccgaaa gctgataaca atttcaacaa agaacaacaa aatgcttct 360
atgaaatctt gaatatgcct aacttaaacg aagaacaacg caatggttc atccaaagct 420
taaaagatga cccaaaggca agtgctaacc tattgtcaga agctaaaag ttaaatgaat 480
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aagtacttgg tacagcacca taggatcc 1288

<210> 8
<211> 426
<212> PRT
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<223> protein A from cloning vector

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<222> (265) .. (426)

<223> CBPA

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Gly Glu Ala Gln Lys Leu Asn Asp Ser Gln Ala Pro Lys Ala Asp Ala

35 40 45

Gln Gln Asn Asn Phe Asn Lys Asp Gln Gln Ser Ala Phe Tyr Glu Ile

50 55 60

Leu Asn Met Pro Asn Leu Asn Glu Ala Gln Arg Asn Gly Phe Ile Gln

65 70 75 80

Ser Leu Lys Asp Asp Pro Ser Gln Ser Thr Asn Val Leu Gly Glu Ala

85 90 95

Lys Lys Leu Asn Glu Ser Gln Ala Pro Lys Ala Asp Asn Asn Phe Asn

100 105 110

Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu Asn Met Pro Asn Leu

115 120 125

Asn Glu Glu Gln Arg Asn Gly Phe Ile Gln Ser Leu Lys Asp Asp Pro

130 135 140

Ser Gln Ser Ala Asn Leu Leu Ser Glu Ala Lys Lys Leu Asn Glu Ser

145 150 155 160

Gln Ala Pro Lys Ala Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala

165 170 175

Phe Tyr Glu Ile Leu His Leu Pro Asn Leu Asn Glu Glu Gln Arg Asn

180 185 190

Gly Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Leu

195 200 205

Leu Ala Glu Ala Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys Ala Asp

210 215 220

Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu His

225 230 235 240

Leu Pro Asn Leu Thr Glu Glu Gln Arg Asn Gly Phe Ile Gln Ser Leu
245 250 255
Lys Asp Asp Pro Gly Asn Ser Met Ala Ala Thr Ser Ser Met Ser Val
260 265 270
Glu Phe Tyr Asn Ser Asn Lys Ser Ala Gln Thr Asn Ser Ile Thr Pro
275 280 285
Ile Ile Lys Ile Thr Asn Thr Ser Asp Ser Asp Leu Asn Leu Asn Asp
290 295 300
Val Lys Val Arg Tyr Tyr Tyr Ser Asp Gly Thr Gln Gln Thr
305 310 315 320
Phe Trp Cys Asp His Ala Gly Ala Leu Leu Gly Asn Ser Tyr Val Asp
325 330 335
Asn Thr Ser Lys Val Thr Ala Asn Phe Val Lys Glu Thr Ala Ser Pro
340 345 350
Thr Ser Thr Tyr Asp Thr Tyr Val Glu Phe Gly Phe Ala Ser Gly Arg
355 360 365
Ala Thr Leu Lys Lys Gly Gln Phe Ile Thr Ile Gln Gly Arg Ile Thr
370 375 380
Lys Ser Asp Trp Ser Asn Tyr Thr Gln Thr Asn Asp Tyr Ser Phe Asp
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Gly Gly Ala Lys Val Leu Gly Thr Ala Pro
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<212> DNA
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<223> taken from bovine

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acacaaggac aaactttctg gtgtgaccat gctgggtcat tattagaaa tagtatgtt     300
gataacacta gcaaagtgc agcaaaacttc gttaaagaaa cagcaagccc aacatcaacc   360
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aatcctactt ctgcaacatt tgatcccggt accatgggtc ctccctctgg aagcacttcc  660
gctgccagca gctccaacta ttgcaaccag atgatgaaga gccggaacct gaccaaagat  720
cgatgcaagc cagtgAACAC ctttgtcac gagtccctgg ctgatgtcca ggccgtgtgc 780
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<223> taken from Clostridium cellulovorans

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<222> (226)..(326)

<223> taken from bovine

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10

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35	40	45
Asn Ser Ile Thr Pro Ile Ile Lys Ile Thr Asn Thr Ser Asp Ser Asp		
50	55	60
Leu Asn Leu Asn Asp Val Lys Val Arg Tyr Tyr Tyr Thr Ser Asp Gly		
65	70	75
Thr Gln Gly Gln Thr Phe Trp Cys Asp His Ala Gly Ala Leu Leu Gly		
85	90	95
Asn Ser Tyr Val Asp Asn Thr Ser Lys Val Thr Ala Asn Phe Val Lys		
100	105	110
Glu Thr Ala Ser Pro Thr Ser Thr Tyr Asp Thr Tyr Val Glu Phe Gly		
115	120	125
Phe Ala Ser Gly Arg Ala Thr Leu Lys Lys Gly Gln Phe Ile Thr Ile		
130	135	140
Gln Gly Arg Ile Thr Lys Ser Asp Trp Ser Asn Tyr Thr Gln Thr Asn		
145	150	155
Asp Tyr Ser Phe Asp Ala Ser Ser Ser Thr Pro Val Val Asn Pro Lys		
165	170	175
Val Thr Gly Tyr Ile Gly Gly Ala Lys Val Leu Gly Thr Ala Pro Gly		
180	185	190
Pro Asp Val Pro Ser Ser Ile Ile Asn Pro Thr Ser Ala Thr Phe Asp		
195	200	205
Pro Gly Thr Met Gly Pro Pro Pro Gly Ser Thr Ser Ala Ala Ser Ser		
210	215	220
Ser Asn Tyr Cys Asn Gln Met Met Lys Ser Arg Asn Leu Thr Lys Asp		
225	230	235
Arg Cys Lys Pro Val Asn Thr Phe Val His Glu Ser Leu Ala Asp Val		
245	250	255
Gln Ala Val Cys Ser Gln Lys Asn Val Ala Cys Lys Asn Gly Gln Thr		
260	265	270
Asn Cys Tyr Gln Ser Tyr Ser Thr Met Ser Ile Thr Asp Cys Arg Glu		
275	280	285
Thr Gly Ser Ser Lys Tyr Pro Asn Cys Ala Tyr Lys Thr Thr Gln Ala		
290	295	300
Asn Lys His Ile Ile Val Ala Cys Glu Gly Asn Pro Tyr Val Pro Val		

305

310

315

320

His Phe Asp Ala Ser Val

325

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<211> 24

<212> DNA

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<210> 12

<211> 18

<212> DNA

<213> Synthetic Oligonucleotide;

<400> 12

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18

<210> 13

<211> 22

<212> DNA

<213> Synthetic Oligonucleotide;

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22